

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62081AP, TD62081CP, TD62081F, TD62081AF, TD62082AP, TD62082CP  
TD62082F, TD62082AF, TD62083AP, TD62083CP, TD62083F, TD62083AF  
TD62084AP, TD62084CP, TD62084F, TD62084AF

## 8CH DARLINGTON SINK DRIVER

The TD62081AP/CP/F/AF Series are high-voltage, high-current darlington drivers comprised of eight NPN darlington pairs.

All units feature integral clamp diodes for switching inductive loads.

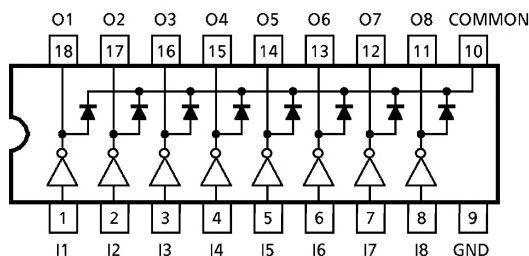
Applications include relay, hammer, lamp and display (LED) drivers.

### FEATURES

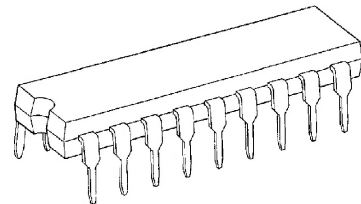
- Output current (single output)  
500mA (Max.) (TD62081AP/F/AF series)  
400mA (Max.) (TD62081CP series)
- High sustaining voltage output  
35V (Min.) (TD62081F series)  
50V (Min.) (TD62081AP/AF series)  
100V (Min.) (TD62081CP series)
- Output clamp diodes
- Inputs compatible with various types of logic.
- Package type-AP, CP : DIP-18pin
- Package type-F, AF : SOP-18pin

TYPE	INPUT BASE RESISTOR	DESIGNATION
TD62081AP/CP/F/AF	External	General Purpose
TD62082AP/CP/F/AF	10.5-k $\Omega$ + 7V Zener diode	14~25V PMOS
TD62083AP/CP/F/AF	2.7k $\Omega$	TTL, 5V CMOS
TD62084AP/CP/F/AF	10.5k $\Omega$	6~15V PMOS, CMOS

### PIN CONNECTION (TOP VIEW)

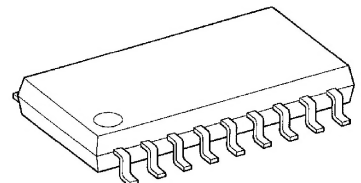


TD62081AP/CP, TD62082AP/CP  
TD62083AP/CP, TD62084AP/CP



DIP18-P-300-2.54D

TD62081F/AF, TD62082F/AF  
TD62083F/AF, TD62084F/AF



SOP18-P-375-1.27

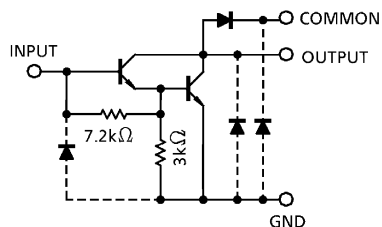
Weight  
DIP18-P-300-2.54D : 1.478g (Typ.)  
SOP18-P-375-1.27 : 0.41g (Typ.)

961001EBA2

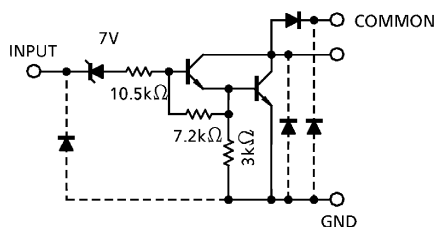
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**SCHEMATICS (EACH DRIVER)**

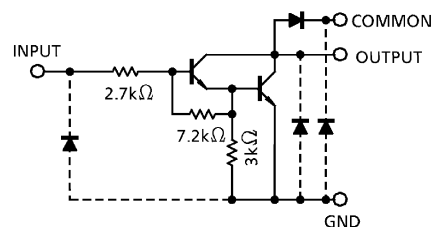
TD62081AP / CP / F / AF



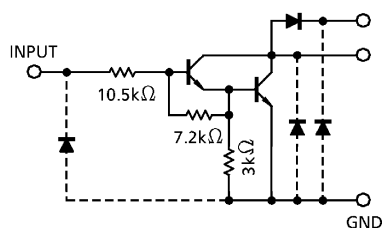
TD62082AP / CP / F / AF



TD62083AP / CP / F / AF



TD62084AP / CP / F / AF



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	RATING	UNIT
Output Sustaining Voltage	AP, AF	V <sub>CE (SUS)</sub>	− 0.5~50	V
	CP		− 0.5~100	
	F		− 0.5~35	
Output Current		I <sub>OUT</sub>	500	mA / ch
CP			400	
Input Voltage		V <sub>IN</sub> (Note 1)	− 0.5~30	V
Input Current		I <sub>IN</sub> (Note 2)	25	mA
Clamp Diode Reverse Voltage	AP, AF	V <sub>R</sub>	50	V
	CP		100	
	F		35	
Clamp Diode Forward Current		I <sub>F</sub>	500	mA
CP			400	
Power Dissipation	AP, CP	P <sub>D</sub>	1.47	W
	F, AF		0.96	
Operating Temperature		T <sub>opr</sub>	− 40~85	°C
Storage Temperature		T <sub>stg</sub>	− 55~150	°C

(Note 1) Except TD62081AP/CP/F/AF

(Note 2) Only TD62081AP/CP/F/AF

RECOMMENDED OPERATING CONDITIONS ( $T_a = -40 \sim 85^\circ\text{C}$ )

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Sustaining Voltage	AP, AF	V <sub>CE (SUS)</sub>		0	—	50	V
	CP			0	—	100	
	F			0	—	35	
Output Current	AP, CP	I <sub>OUT</sub>	T <sub>pw</sub> = 25ms, Duty = 10%, 8 Circuits	0	—	347	mA / ch
			T <sub>pw</sub> = 25ms, Duty = 50%, 8 Circuits	0	—	123	
	F, AF		T <sub>pw</sub> = 25ms, Duty = 10%, 8 Circuits	0	—	268	
			T <sub>pw</sub> = 25ms, Duty = 50%, 8 Circuits	0	—	90	
Input Voltage	Except TD62081AP / CP / F / AF	V <sub>IN</sub>		0	—	30	V
Input Voltage (Output On)	TD62082AP / CP / F / AF	V <sub>IN (ON)</sub>		14	—	30	V
	TD62083AP / CP / F / AF			3.5	—	30	
	TD62084AP / CP / F / AF			8	—	30	
Input Current	Only TD62081AP / CP / F / AF	I <sub>IN</sub>		0	—	5	mA
Clamp Diode Reverse Voltage	AP, AF	V <sub>R</sub>		—	—	50	V
	CP			—	—	100	
	F			—	—	35	
Clamp Diode Forward Current		I <sub>F</sub>		—	—	400	mA
	CP			—	—	320	
Power Dissipation	AP, CP	P <sub>D</sub>		—	—	0.52	W
	F, AF			—	—	0.4	

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

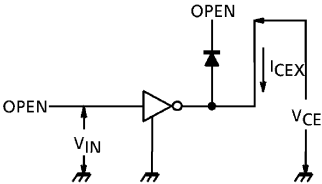
CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Leakage Current		AP, AF	1	V <sub>CE</sub> = 50V	Ta = 25°C	—	—	50	μA
		CP		V <sub>CE</sub> = 100V					
		F		V <sub>CE</sub> = 35V					
		AP, AF		V <sub>CE</sub> = 50V	Ta = 85°C	—	—	100	
		CP		V <sub>CE</sub> = 100V					
		F		V <sub>CE</sub> = 35V					
	TD62082	AP, AF		V <sub>CE</sub> = 50V	V <sub>IN</sub> = 6V	—	—	500	
		CP		V <sub>CE</sub> = 100V					
		F		V <sub>CE</sub> = 35V					
	TD62084	AP, AF		V <sub>CE</sub> = 50V	V <sub>IN</sub> = 1V	—	—	500	
		CP		V <sub>CE</sub> = 100V					
		F		V <sub>CE</sub> = 35V					
Collector-Emitter Saturation Voltage		V <sub>CE</sub> (sat)	2	I <sub>OUT</sub> = 350mA, I <sub>IN</sub> = 500μA	—	1.3	1.6	V	
			I <sub>OUT</sub> = 200mA, I <sub>IN</sub> = 350μA	—	1.1	1.3			
			I <sub>OUT</sub> = 100mA, I <sub>IN</sub> = 250μA	—	0.9	1.1			
Input Current	TD62082AP / CP / F / AF	I <sub>IN</sub> (ON)	2	V <sub>IN</sub> = 17V	—	0.82	1.25	mA	
	TD62083AP / CP / F / AF			V <sub>IN</sub> = 3.85V	—	0.93	1.35		
	TD62084AP / CP / F / AF			V <sub>IN</sub> = 5V	—	0.35	0.5		
				V <sub>IN</sub> = 12V	—	1.0	1.45		
		I <sub>IN</sub> (OFF)	4	I <sub>OUT</sub> = 500μA, Ta = 85°C	50	65	—	μA	
Input Voltage (Output On)	TD62082AP / CP / F / AF	V <sub>IN</sub> (ON)	5	V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 300mA	—	—	13	V	
	TD62083AP / CP / F / AF			V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 200mA	—	—	2.4		
				V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 250mA	—	—	2.7		
				V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 300mA	—	—	3.0		
				V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 125mA	—	—	5.0		
				V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 200mA	—	—	6.0		
				V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 275mA	—	—	7.0		
	TD62084AP / CP / F / AF			V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 350mA	—	—	8.0		
DC Current Transfer Ratio		h <sub>FE</sub>	2	V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 350mA	1000	—	—		
Clamp Diode Reverse Current		I <sub>R</sub>	6	Ta = 25°C (Note)	—	—	50	μA	
			Ta = 85°C (Note)	—	—	100			
Clamp Diode Forward Voltage		V <sub>F</sub>	7	I <sub>F</sub> = 350mA	—	—	2.0	V	
CP	I <sub>F</sub> = 280mA			—	—	1.8			
Input Capacitance		C <sub>IN</sub>	—		—	15	—	pF	

(Note)  $V_R = V_R \text{ MAX.}$

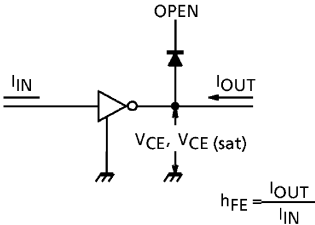
CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Turn-On Delay	AP, AF	t <sub>ON</sub>	8	R <sub>L</sub> = 125Ω, V <sub>OUT</sub> = 50V	—	0.1	—	μs	
	CP			R <sub>L</sub> = 312Ω, V <sub>OUT</sub> = 100V	—	0.1	—		
	F			R <sub>L</sub> = 87.5Ω, V <sub>OUT</sub> = 35V	—	0.1	—		
Turn-Off Delay	AP, AF	t <sub>OFF</sub>		R <sub>L</sub> = 125Ω, V <sub>OUT</sub> = 50V	—	0.2	—		
	CP			R <sub>L</sub> = 312Ω, V <sub>OUT</sub> = 100V	—	3.0	—		
	F			R <sub>L</sub> = 87.5Ω, V <sub>OUT</sub> = 35V	—	0.2	—		

TEST CIRCUIT

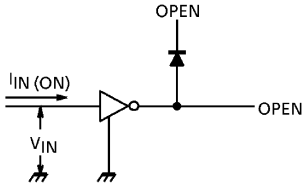
1.  $I_{CEX}$



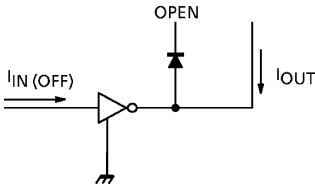
2.  $V_{CE} (sat), h_{FE}$



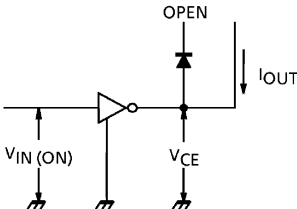
3.  $I_{IN} (ON)$



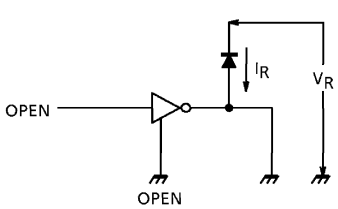
4.  $I_{IN} (OFF)$



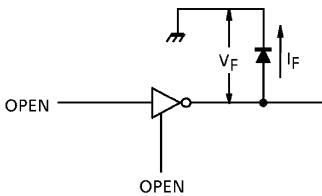
5.  $V_{IN} (ON)$

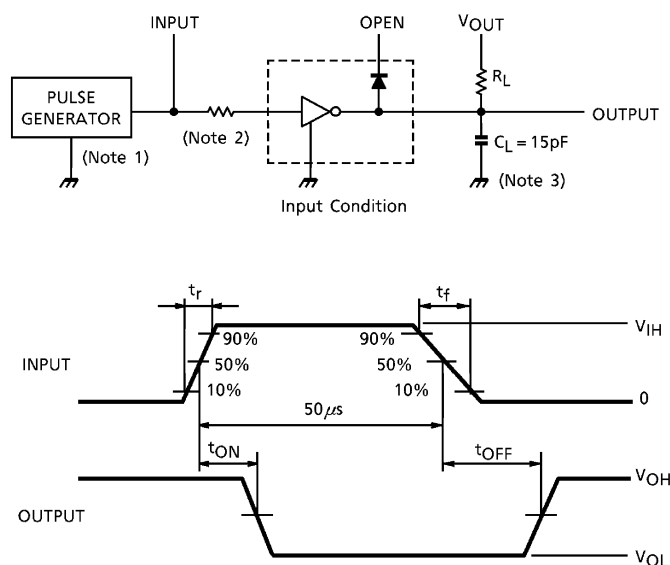


6.  $I_R$



7.  $V_F$



8.  $t_{ON}$ ,  $t_{OFF}$ 


(Note 1) Pulse Width  $50\mu s$ , Duty Cycle 10%  
Output Impedance  $50\Omega$ ,  $t_r \leq 5ns$ ,  $t_f \leq 10ns$

(Note 2) See below.

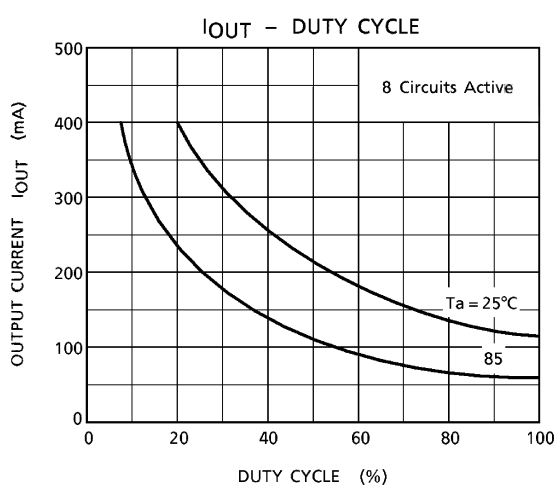
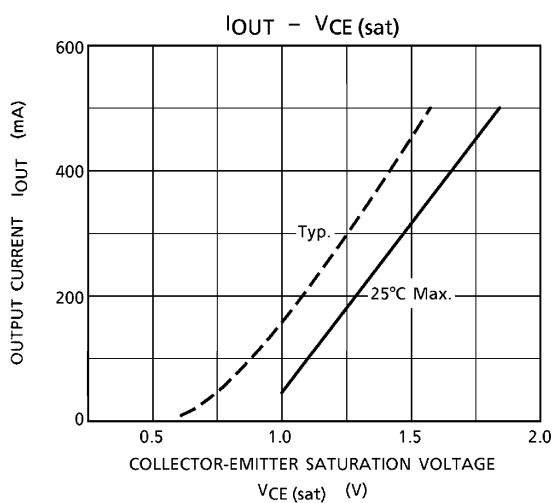
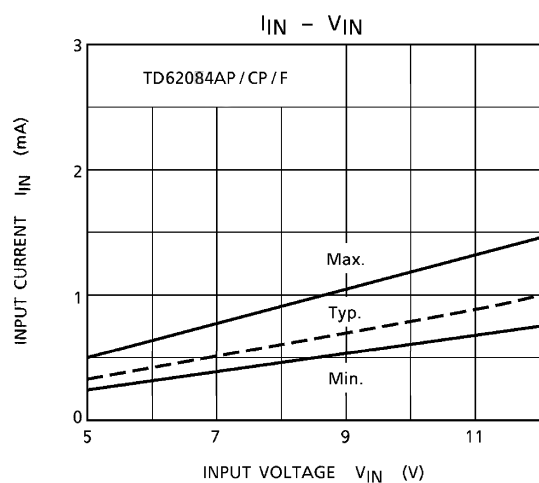
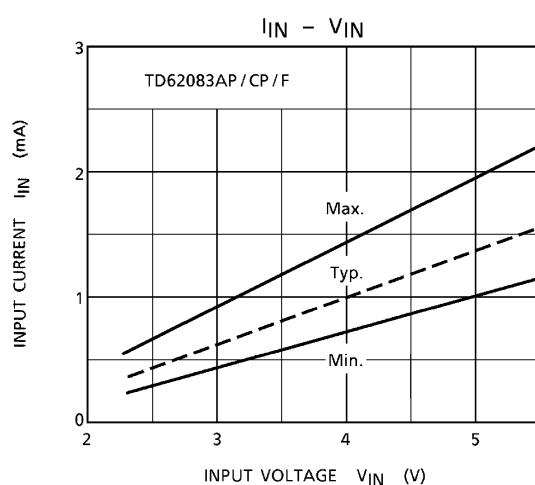
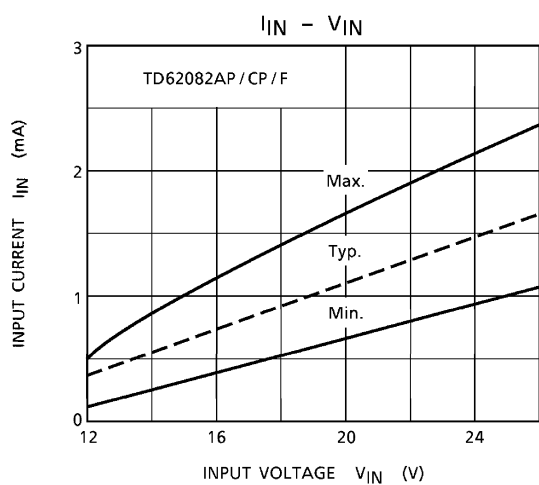
## INPUT CONDITION

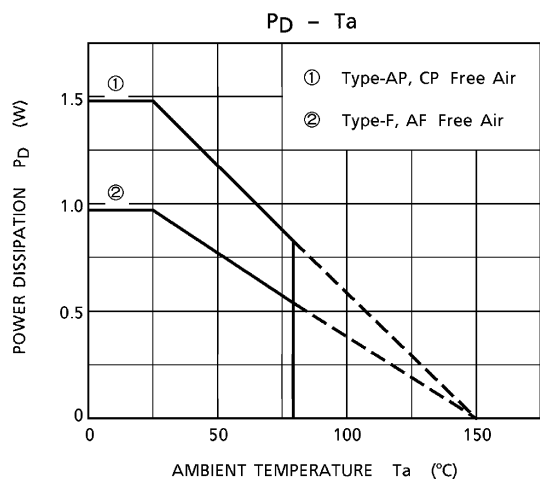
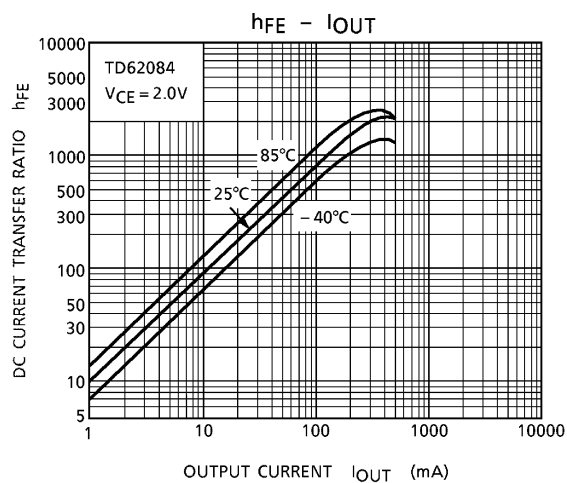
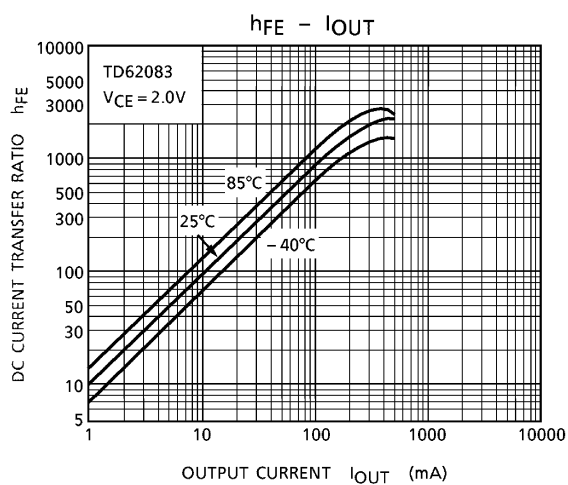
TYPE NUMBER	R1	$V_{IH}$
TD62081AP/CP/F/AF	$2.7k\Omega$	3V
TD62082AP/CP/F/AF	$0\Omega$	13V
TD62083AP/CP/F/AF	$0\Omega$	3V
TD62084AP/CP/F/AF	$0\Omega$	8V

(Note 3)  $C_L$  includes probe and jig capacitance

## PRECAUTIONS for USING

Utmost care is necessary in the design of the output line, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



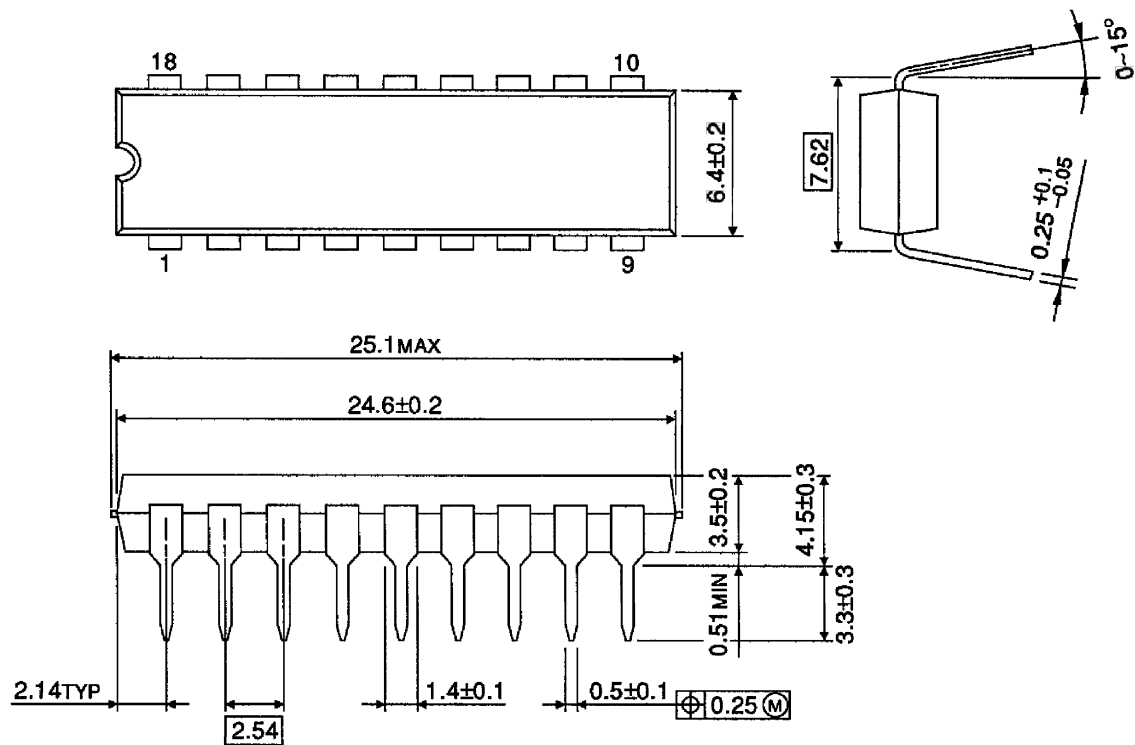




**OUTLINE DRAWING**

DIP18-P-300-2.54D

Unit : mm

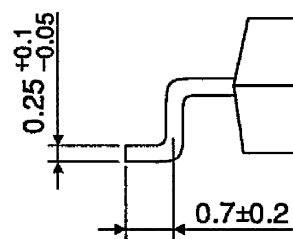
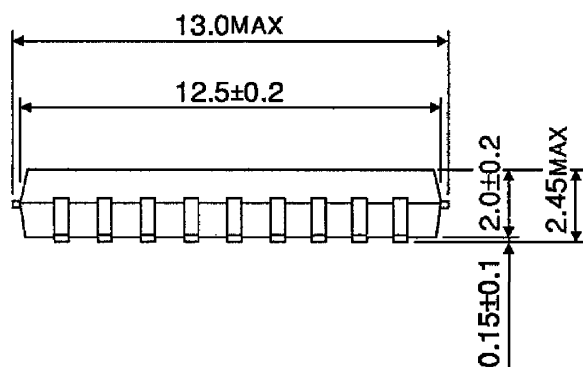
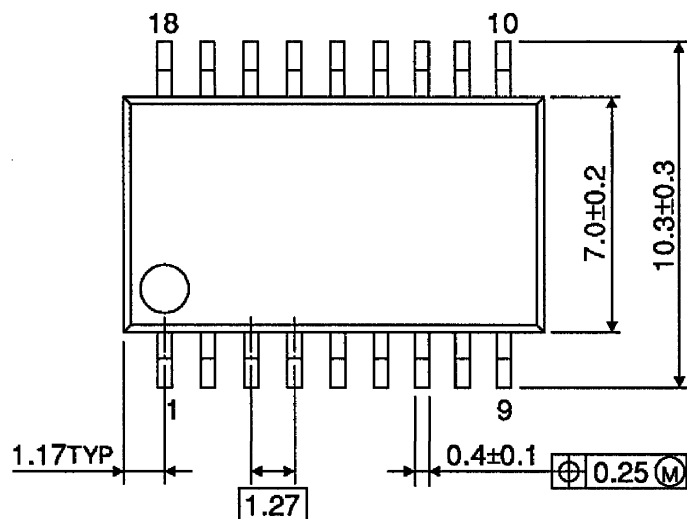


Weight : 1.478g (Typ.)

**OUTLINE DRAWING**

SOP18-P-375-1.27

Unit : mm



Weight : 0.41g (Typ.)